Safety in the Netherlands

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Mr Chairman, distinguished Members of the Committee, ladies and gentlemen, it is a great honor for me to testify on the subject of flood protection policy in the Netherlands.

Let me tell you something about myself. I spent my entire career in the Netherlands' Ministry of Public Works and Water Management, in the department called Rijkswaterstaat. It is comparable to the U.S. Army Corps of Engineers. From 1981 till 1997 I was in charge of policymaking on flood protection.

Mr Chairman, I have submitted formal written testimony called "Flood Defense in the Netherlands – Lessons Learned from Dutch History." I respectfully request that this be inserted in the Record of your Committee.

First of all I need to point out that the water situation in the Netherlands is quite different from that in the United States. Almost 60 percent of our country is threatened by water: either by storm surges, and/or by floods due to high discharges of rivers. Cities such as Rotterdam (our main harbor and the world's 2nd largest port), Amsterdam (our capital), and our largest international airport are below sea level. We earn 70 percent of our Gross National Product, and attract huge amounts of foreign investment, in these flood prone areas. On top of that, millions of people live below sea level, yet they feel safe and secure. Hundreds of years ago we established dedicated organizations whose sole purpose was to defend the country against flooding from the sea and rivers. On a local (or county) level these are called the Water Boards, and on the national (or federal) level it is my organization, Rijkswaterstaat.

My main message to your Committee, Mr Chairman, is that we have learned – and continue to learn – from history, especially the history of flood disasters. Each flood disaster in the Netherlands – from the 13th century onwards – has brought us new lessons to be learned for keeping our country habitable, livable, and attractive to citizens and businesses.

After the floods of 1953, in which nearly 2,000 people died, we designed our Deltaplan, primarily meant for the coastal areas. In this Deltaplan we developed for the first time a comprehensive system of standards for designing dikes and barriers for the whole country. These government-endorsed standards assure the quality of our water defense system. All our dikes were rebuilt accordingly, and the total length of our coastline was shortened by more than 700 kilometers as the result of closing estuaries with dams or storm surge barriers.

It took 50 years from idea to completion, and in the interim we incorporated new insights about morphological as well as ecological processes. For these reasons the last two barriers, constructed at the end of the Deltaplan, are partly open and movable:

- the Easternscheldt Barrier because of the fishery, sedimentation, and the environment;
- the Stormsurge Barrier in the Rotterdam Waterway because of shipping and sedimentation.

These barriers are closed only in case of storm surges.

In the Netherlands, as in your country, cost is a factor. In total, over those 50 years, we invested about 15 billion US dollars in our Deltaplan, in today's cost. Not an inconsequential

cost, surely, but also a cost that is pennies on the dollar compared to costs that we would have incurred had we not made that financial commitment.

Mr. Chairman, The Netherlands is threatened not only by the sea, but by 3 of Europe's major rivers that empty into the North Sea via my country. In 1993 and 1995, the extreme discharges of the major rivers nearly overtopped our river dikes. 250,000 people and their livestock were evacuated. That event made clear again that we could not postpone upgrading the river dikes. We have then learned that a water defense system includes not only technical solutions. It is not just building and maintaining dikes. Disasters can always happen, and therefore you need evacuation plans.

We also learned that it is always important to think about zoning, that is to say legislating the areas to be reserved for urban development and for water. Our government designed this new policy in a document called "More Room for Water", in which our "Spatial Planning Act", or land-use act, plays a pivotal role.

Now, if you were to ask me what are the most important elements of our protection-policy, I would say the following:

- knowhow & organizational structure
- standards & legislation
- priorities & budget
- prevention & zoning

As to *knowhow*, it clearly includes technology, morphological and ecological knowledge, statistics and predictions. New developments such as sea level rise and climate change are important components. To ensure that the development of this knowledge stays on the highest level, we have a department such as mine, working on the national level, as a respected partner in the international exchange of knowledge. My department, Rijkswaterstaat, by the way, has been around since 1798. (And yesterday, I found out, that your Army Corps of Engineers is just three years older!)

On the *local* level, we have – for 800 years – one-issue organizations, called "Water Boards." Their only task is water management, which includes flood protection. Water Boards are public entities with their own election and tax system.

Now I come to standards and legislation.
Our *standards* are accepted risk levels related to the design-criteria of our dikes. Those standards are laid down in the "Flood Defense Act".

- For the economically most important and densely populated part of the country, we design our dikes and dunes to be strong enough to withstand a storm-situation with a probability of 1 to 10,000 a year! That means, that a Dutchman – if he should live a 100 years – has a chance of 1 percent to witness such an event. For our parliament, these odds became the acceptable standard.
- For the less important coastal areas we calculate the probability of 1 to 4,000, and
- along the main rivers 1 to 1,250.

Every five years, the entire water defense system is assessed for compliance by the local water Boards. A summary of these assessments is submitted to the national parliament. In order to be able to make these assessments, it is essential to know what the hydraulic specifications, belonging to the political standards, are. My department, Rijkswaterstaat,

publishes these hydraulic specifications, in which we implement the latest knowledge of statistics, failure mechanisms of dikes, sea level rise and climate change.

A few words about *priorities and budget*.
Since 1953, financing of renovating the dikes has been a *national priority*. All funds for rebuilding are allocated by the central government. Maintenance – financially and operationally – is totally controlled by the Water Boards, who in turn, tax the local population. Since the Water Boards have no other responsibility than water, other priorities never go to the detriment of the water defense system.

And finally I get to the matter of prevention and zoning.
The notion of *zoning* is fairly new in our approach. We need to answer questions such as whether we reserve space for urban development or whether we dedicate space exclusively for water. This is a tough issue, but an issue we cannot ignore.

Last but not least it is important to realize that total safety does not exist and therefore it is essential to *be prepared*, for instance by having evacuation plans.
After all, Members of the Committee, disasters do happen.

Thank you, Mr Chairman.